Ana Lizette **González Cataño**

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Summary

Mechanical Engineer with hands-on experience in industrial design, 3D modeling, and prototyping. Strong skills in CAD (SolidWorks, NX), DFMA, and product development from concept to presentation. Passionate about innovative solutions and user-centered engineering, with demonstrated success in internship and academic environments.

Education

Cranfield University — *Cranfield, United Kingdom*

M.Sc. Advanced Motorsport Engineering — *Sept. 2023 - Sept. 2024*

- Modules: Powertrains, Motorsports Electronics and Data Acquisition, Business of Motorsport, Vehicle Dynamics, Aerodynamics, Computational Fluid Dynamics, Composite Structures, Structural Analysis
- Extracurricular Activities: F1 Design Sprint

Tecnológico de Monterrey — *Chihuahua, Chihuahua, México & Monterrey, Nuevo León, México*

B.Sc. Mechanical Engineering — *Aug. 2019 - June 2023*

- Extracurriculars: Gravity Racecar CUU (building & driving, 1st % second place), Familia Tec CUU (math & english teacher the first year, directive board on the second year), Violin Workshop
- Electives: Mathematics & Data Science for Decision Making (1st Semester), Humanities & Fine Arts; Image Culture (2nd Semester), Argumentation, Debate, & the Art of Public Speaking (4th Semester), Ethics, Sustainability, & Social Responsibility (5th Semester), Automotive Engineering (7th Semester)
- Grade: 92.32, with Academic Distinction and 40% tuition scholarship based on academic performance & entrance evaluation

Work Experience

Emerson — *Chihuahua, Chihuahua, México*

Design Internship — *March 2023 - June 2023*

- Designed and 3D-printed a plastic prototype of a rubber seal for the orbital weld heads which improved fit and ensured airtight sealing, supporting weld integrity by minimizing contamination and leakage
- Verified and updated legacy blueprints to eliminate production flaws in a holder fixture by modifying 3D dimensions and revising technical drawings in compliance with ASME Y14.5 standards
- Designed a compact tray to hold bobbin handles for different-sized coils, ensuring minimal space usage, rotational freedom, isolation to prevent contact or static buildup, and reduced assembly time
- Designed and 3D-printed a rapid tracing fixture for welding repellent pens (stop-offs), enabling consistent, straight, and uniform application at the correct height around the full pipe circumference
- Designed and 3D-printed an ergonomic tooling prototype to handle thin copper wires in small coils, enabling precise placement into slots without pinching or causing damage
- Designed single-piece 3D-printed clamps for brazing Coriolis mass flow sensors, designed to avoid thermal damage or weld contamination, reduce setup complexity, and streamline furnace preparation
- Designed a tray prototype to maximize the number of coils of varying sizes transported per tray, incorporating design features to address electromagnetic sensitivities and protect delicate components using bone-shaped slots of varying depths and chamfers for both product and user safety
- Presented a project summary and design analysis to senior supervisors and the factory's head manager, showcasing current designs, evaluating effectiveness through DFA/DFMA principles, and proposing improvements for cost and time reduction.

Academic Projects

Group Design Project — *Cranfield University, Cranfield, United Kingdom*

Multi-Disciplinary 3-Month Project — *February 2024*

- Collaborated on the design of an alternative-fuel racing vehicle powered by a rotary engine, developed for drag, circuit, and rally-style sprint events.
- Generated realistic track models using SolidWorks, OpenStreetMap, Blender, DEFRA DEM, and LIDAR data to support vehicle simulation with accurate elevation and distance profiles.
- Researched historical and modern rotary engine configurations to evaluate performance feasibility under emission constraints.
- Developed MATLAB tools for early-stage suspension setup, including spring/damper selection based on ride frequency and car mass.
- Conducted informal interviews with dirt racing drivers to inform tyre selection strategy for mixed-terrain performance.
- Designed the suspension system in CAD, including wheel packaging for in-wheel motors, gearboxes, custom knuckles, and horizontally mounted onboard dampers.
- Produced regulatory-compliant lighting and bodywork elements and contributed to project presentations and visual renders.

Carbon Fibre Wing Airfoil with Flax C Spar/Core

Cranfield University, Cranfield, United Kingdom

Composite Structures Project — *January 2024*

- Designed and manufactured a carbon fibre wing airfoil with a flax fibre C-spar and core, documenting each step to minimise manufacturing errors and ensure process repeatability
- Calculated expected wing deflection under load and evaluated performance against defined acceptance criteria
- Performed 3-point bending tests on the prototype, compared experimental and theoretical results, and analysed discrepancies considering material properties, manufacturing variations, and structural behaviour

Mechanically-Assisted Screw Dispenser Design

Tecnológico de Monterrey, Chihuahua, Chihuahua, México

Client-Specific Fixture Prototype for Electronics Manufacturing (SMTC) — *May 2023*

- Designed a fixture prototype aimed at reducing assembly time by 40% for high-tension, multi-contact industrial connectors in an electronics manufacturing context
- Defined SMART goals and conducted a risk analysis, enabling on-time delivery and reducing risks related to both manufacturability and end-use reliability
- Generated multiple concept solutions using market research and mechanical analogies from non-related systems (e.g., Wankel engine rotary motion, centrifugal effect in turbochargers, and magnetically driven realignment)
- Developed a full CAD model using real-world, market-available components and performed FEA simulations to validate load paths, motion smoothness, and high safety factors under varied operating conditions
- Selected materials for both structural integrity and electromagnetic compatibility, while considering cost-efficiency and supplier availability
- Outlined a proposed manufacturing process based on internal capabilities, identifying potential bottlenecks and proposing alternatives to support future prototyping or production
- Conducted strain and angle validation calculations to ensure consistent screw orientation, smooth feed behavior, and long-term reliability
- Created 3D technical drawings following ASME Y14.5-2018 dimensioning and tolerancing standards to reduce production errors and ensure manufacturability
- Applied DFMA (Design for Manufacturing & Assembly) principles, TPM (Total Productive Maintenance) considerations, and Part Reduction (PR) strategies to improve simplicity, maintainability, and scalability

Jaguar I-PACE Battery Tray Redesign

Tecnológico de Monterrey, Monterrey, Nuevo León, México

Automotive Engineering Course First Midterm Project — *August 2022*

- Redesigned the Jaguar I-PACE battery tray for lightweighting, transitioning from steel to aluminium to improve efficiency and sustainability
- Reduced overall weight and material usage without compromising structural integrity or required battery protection standards
- Performed material selection based on mechanical performance, availability, cost, and environmental considerations
- Carried out structural analysis using FEA and vibration simulations at key frequency ranges to validate performance
- Applied DFA, DFMA, and DFMEA methodologies to evaluate manufacturing feasibility, cost efficiency, and potential failure modes

AGV Vehicle Design and Manufacturing

Tecnológico de Monterrey, Monterrey, Nuevo León, México

Automotive Engineering Course Second Midterm Project — *November 2022*

- Collaborated in a multidisciplinary team to design and manufacture an autonomous guided vehicle (AGV) for hospital logistics applications
- Led the design and manufacturing of the chassis using ASTM A36 steel, ensuring compatibility with component integration and hospital size constraints
- Performed FEA simulations to validate structural integrity, load distribution, and overall durability of the chassis
- Defined optimal suspension anchor points in CAD, balancing spatial constraints and suspension performance requirements
- Produced technical 2D drawings following industry standards to support precise steel cutting and fabrication
- Participated in hands-on chassis welding and assembly

Skills

Technical Skills

- Solidworks, NX, ANSYS, MATLAB, Python, MiniTab

Volunteering

- Support to a motorsport-themed student group ”Sucesso Motor CUU” with logistics, coordination, and general assistance
- Assistance in the construction of an economic kitchen and general cleaning of the home for children ”Casa Hogar”

Other Experience & Projects

Event Support Staff

Chihuahua, Chihuahua, México

”Clásico” Club Hípico Campestre de Chihuahua — *May 21 2025 - June 5 2025 (Contract)*

- Provided broad event support before and during the club’s main annual show jumping competition
- Designed graphic materials (cards & others)
- Assisted in the delivery of prizes and awardsto winning participants
- Assisted in the management sponsor-related logistics (mentions, utility acquisition, etc.)
- Assisted in vendor logistics such as placement
- Supported the event secretary with on-site administrative tasks

Hackathon

Chihuahua, Chihuahua, México

Innovative Technology & Coding Competition — *2018*

- Project proposal with the aim to solve a local need; the selected issue of our team was lost pets
- Came in 2nd place with the proposal of e-collar for pets mainly with information storage and GPS-tracking